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EXAMINER

SPEARS, ERIC J

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/820,365

Applicant(s)

YONEZAWA ET AL.

Examiner

Eric J Spears

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4,7-11,13-17 and 19-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4,7-11,13-17 and 19-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8-11, 13-15, and 22-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "the first transparent electrode" and "the second transparent electrode" in lines 9-10. There is insufficient antecedent basis for this limitation in the claim.

Claims not specifically mentioned are indefinite due to their dependency from an indefinite base claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

- (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
- (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 8, 16, 17, and 19-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Theil (6,373,117).

Regarding Claim 8, Theil teaches a first transmission photodetector (262,264,266) configured to carry out a photoelectric transfer with respect to light in a first wavelength band including a predetermined wavelength; and a second photodetector (252, 254, 256), stacked on the first transmission photodetector, configured to detect light passing through the first transmission photodetector (See Fig. 2; Col. 8, lines 31). It should be noted that as light passes through the first photodetector to reach the second photodetector, both the first and second electrodes of the first photodetector receive light.

Regarding Claim 16, Theil teaches a first transmission photodetector (468,466,464) configured to carry out a photoelectric transfer with respect to light in a first wavelength band including a predetermined wavelength, a second photodetector (448, 446, 444), stacked on the first transmission photodetector, configured to detect light passing through the first transmission photodetector (See Fig. 4; Col. 8, lines 31), a transparent substrate 454 provided between the first and second photodetectors, the transparent substrate including two principal planes placed on opposite sides, wherein the first transmission photodetector comprises a first and second transparent electrodes (470, 462), the second transparent electrode being provided on one principal plane of the transparent substrate, and the second photodetector has a third transparent electrode 450 provided on the other principal plane of the transparent substrate wherein the first and second photodetectors are arranged in an optical path so that light

transmitted in the optical path passes through the stacked type photodetector, and wherein the stacked type photodetector is configured to receive light both on a first surface of the first transparent electrode and a second surface of the second transparent electrode. It should be noted that as light passes through the first photodetector to reach the second photodetector, both the first and second electrodes of the first photodetector receive light.

Regarding Claim 17, Theil teaches the transparent electrodes 240 and 258 are divided into multiple cells (See Fig. 2).

Regarding Claim 19, Theil teaches wherein the plurality of electrode cells are disposed symmetrically with respect to a center on the optical axis of incident light (See Fig. 3).

Regarding Claim 20, Theil teaches wherein the second photodetector has a fourth transparent electrode 442 provided so as to face the third transparent electrode, and each of the first and fourth transparent electrodes has a constant potential during operation (Col. 4, lines 48-55).

Regarding Claim 21, Theil teaches a signal processor 200, integrally provided with the photodetector, configured to process an electric signal every one of the divided electrode cells, the electric signals being obtained from the first and second transmission photodetectors via each of the second and third transparent electrodes (Col. 4, lines 1-10).

Regarding Claim 22, Theil teaches wherein a second wavelength band photoelectric-transferred by the second photodetector includes a longer wavelength

component than that of the first wavelength band photoelectric -transferred by the first transmission photodetector (Col. 8, lines 1-26; Col. 3, lines 30-63).

Claims 8 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Forrest et al. (6,278,055).

Regarding Claim 8, Forrest teaches a first transmission photodetector configured to carry out a photoelectric transfer with respect to light in a first wavelength band including a predetermined wavelength (80Xd); and a second photodetector (80Xc), stacked on the first transmission photodetector, configured to detect light passing through the first transmission photodetector (See Fig. 8). It should be noted that as light passes through the first photodetector to reach the second photodetector, both the first and second electrodes of the first photodetector receive light.

Regarding Claim 11, Forrest teaches wherein the first transmission photodetector comprises: a first transmission electrode 802c ; an organic p-type semiconductor layer stacked on the first transparent electrode 804d; an organic n-type semiconductor 803d layer stacked on the organic p-type semiconductor layer; and a second transparent electrode 802b stacked on the organic n-type semiconductor layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (5,351,209) in view of Forrest et al. (6,278,055).

Regarding Claim 4, Hayashi teaches a transmission photodetector comprising:

a first transparent electrode 10B, a second transparent electrode 10E at least one of the first and second transparent electrodes being divided into a plurality of electrode cells (10-I; See Fig. 3a); and a photoelectric transfer part 10D, 10C sandwiched between the first and second transparent electrodes. the photoelectric transfer part being common to the plurality of electrode cells wherein the first and second transparent electrodes and the photoelectric transfer part are arranged in an optical path so that light transmitted in the optical path passes through the photodetector, and wherein the photodetector is configured to receive light both on a first surface of the first transparent electrode and a second surface of the second transparent electrode (See Fig. 6). Hayashi does not teach wherein the photoelectric transfer part comprises an organic p-type semiconductor layer stacked on the first transparent electrode, and an organic n-type semiconductor layer stacked on the organic p-type semiconductor layer, and wherein the second transparent electrode is stacked on the organic n-type semiconductor layer. However, Forrest teaches transparent photodetectors comprising a transparent electrode 805b, a first organic semiconductor layer 804d (PTCDA or PTCBI; i.e. n-type), a second organic semiconductor layer 803d (CuPc; i.e. p-type), an a transparent electrode 802c. Forrest teaches the layers 804d and 803d form a heterojunction (i.e. a junction of two opposite

polarity layers or a p-n junction). It would have been obvious to one of ordinary skill in the art to modify the device of Hayashi to include organic semiconductor layers which are well known in the art as taught by Forrest, in order to enhance quantum efficiency and voltage.

Regarding Claim 7, Hayashi teaches a transmission photodetector comprising: a first transparent electrode 10B, a second transparent electrode 10E at least one of the first and second transparent electrodes being divided into a plurality of electrode cells (10-I; See Fig. 3a); and a photoelectric transfer part 10D, 10C sandwiched between the first and second transparent electrodes. the photoelectric transfer part being common to the plurality of electrode cells wherein the first and second transparent electrodes and the photoelectric transfer part are arranged in an optical path so that light transmitted in the optical path passes through the photodetector, and wherein the photodetector is configured to receive light both on a first surface of the first transparent electrode and a second surface of the second transparent electrode (See Fig. 6). Hayashi does not teach wherein the photoelectric transfer part comprises an organic p-type semiconductor layer stacked on the first transparent electrode, and an organic n-type semiconductor layer stacked on the organic p-type semiconductor layer, and wherein the second transparent electrode is stacked on the organic n-type semiconductor layer. However, Forrest teaches transparent photodetectors comprising a transparent electrode 805b, a first organic semiconductor layer 804d (PTCDA or PTCBI; i.e. n-type), a second organic semiconductor layer 803d (CuPc; i.e. p-type), and a transparent electrode 802c. Forrest

teaches the layers 804d and 803d form a heterojunction (i.e. a junction of two opposite polarity layers or a p-n junction). It would have been obvious to one of ordinary skill in the art to modify the device of Hayashi to include organic semiconductor layers which are well known in the art as taught by Forrest, in order to enhance quantum efficiency and voltage.

Claims 9, 10, 13, 14, 23, and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Theil (6,373,117) in view of Hoffmann et al. (4,724,388).

Regarding Claims 9 and 10, Theil does not teach a sensitizing dye layer. However, Hoffmann teaches a photoelectric transfer part comprising: a sensitizing dye film absorbing light in a wavelength band including a predetermined wavelength; and a carrier transporting layer (which is also a dielectric layer) sandwiched between the sensitizing dye film and the second transparent electrode B (See Fig. 1; Col. 4, lines 1-21). Therefore, it would have been obvious to one of ordinary skill in the art to modify the device of Theil to include such a dye layer to provide for wavelength dependent photodetection, as such the dye layer photodetectors are well known in the art, in order to achieve wavelength dependent detector without the need for filters or other means.

Regarding Claims 13 and 14, Theil teaches the transparent electrodes 240 and 258 are divided into multiple cells (See Fig. 2).

Regarding Claim 23 and 24, Theil teaches wherein a second wavelength band photoelectric-transferred by the second photodetector includes a longer wavelength

component than that of the first wavelength band photoelectric -transferred by the first transmission photodetector (Col. 8, lines 1-26; Col. 3, lines 30-63).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al. (6,278,055) in view of Hayashi et al. (5,351,209).

Regarding Claim 15, Forrest does not explicitly show the full structure of 2 photodetectors side by side with two photodetectors sharing a common electrode, although Forrest does teach making an array of detectors (Col. 31, lines 26-34). However, Hayashi shows a photodetector with multiple unit cells 10-I, each with a separate transparent electrode 10E, and which all share a common transparent electrode 10B (See Figs 3A, 3C) Therefore, it would have been obvious to one of ordinary skill in the art to provide a pixilated photosensor wherein pixels share a common photoelectric transfer part between them, as such detectors are well known in the art as shown for example in Hayashi, in order to provide easier photosensor array production by eliminating the need for patterning both top and bottom electrodes for each stacked photodetector.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al. (6,278,055) in view of Theil (6,373,177).

Regarding Claim 25, the modified device of Forrest does not teach such a wavelength detection method. However, Theil teaches stacked photodetectors wherein a second photodetector detects light in a different wavelength band from the first

photodetector (Col. 8, lines 1-26; Col. 3, lines 30-63). Therefore, it would have been obvious to modify the modified device of Forrest to provide a multiple color stacked photodetector, as such multiple color stacked photodetectors are well known in the art from Theil, in order to provide for full color sensing in the modified device of Forrest.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Spears whose telephone number is (703) 306-0033. The examiner can normally be reached on Monday-Friday from 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (703) 308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

EJS
10/23/03


Que T. Le
Primary Examiner